

Patent Claims

1. Process for the production of a mistletoe lectin polypeptide in the heterologous system having the sequence:

Y E R L R L R V T H Q T T G X1 E Y F R F I T L  
L R D Y V S S G S F S N E I P L L R Q S T I P  
V S D A Q R F V L V E L T N Q G X2 D S X3 T A A  
I D V T N X4 Y V V A Y Q A G D Q S Y F L R D A  
P R G A E T H L F T G T T R X5 S S L P F X6 G S  
Y X7 D L E R Y A G H R D Q I P L G I X8 Q L I Q  
S V X9 A L R X10 P G G S T R X11 Q A R S I L I L  
I Q M I S E A A R F N P I L W R X12 R Q X13 I N  
S G X14 S F L P D X15 Y M L E L E T S W G Q Q S  
T Q V Q H S T D G V F N N P X16 R L A I X17 X18 G  
N F V T L X19 N V R X20 V I A S L A I M L F V C  
G E R P S S S D V R Y W P L V I R P V I A D D  
V T C S A S E P T V R I V G R X21 G M X22 V D V  
R D D D F H D G N Q I Q L W P S K S N N D P N  
Q L W T I K R D X23 T I R S N G S C L T T Y G Y  
T A G V Y V M I F D C N T A V R E A T I W Q I

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W X24 N G T I I N P R S N L V L A A S S G I K G  
 T T L T V Q T L D Y T L G Q G W L A G N D T A  
 P R E V T I Y G F R D L C M E S N X25 G S V W V  
 E T C X26 S S Q X27 N Q X28 X29 W A L Y G D G S I R  
 P K Q N Q D Q C L T X30 G R D S V S T V I N I V  
 S C S X31 X32 S X33 X34 Q R W V F T N E X35 A I L N  
 L K X36 X37 X38 X39 X40 D V A Q A N P K L R R I I I  
 Y P A T G K P N Q M W L P V X41

or a fragment thereof, comprising the step of expressing by means of a eukaryotic or prokaryotic vector, into which a nucleic acid coding for the mistletoe lectin polypeptide according to the usual genetic code or a fragment thereof is cloned, in a suitable heterologous eukaryotic or prokaryotic host,

wherein X1 is D or E, X2 is G or Q, X3 is I or V, X4 is L or A, X5 is DR or missing, X6 is N or T, X7 is P or T, X8 is D or E, X9 is S or T, X10 is F or Y, X11 is T or A, X12 is A or Y, X13 is Y or D, X14 is A or E, X15 is V or M, X16 is I or F, X17 is P or S, X18 is P or T, X19 is T or S, X20 is D or S, X21 is N or S, X22 is C or R, X23 is G or N, X24 is G or D, X25 is G or Q, X26 is V or D, X27 is Q or K, X28 is G or missing, X29 is R or K, X30 is C or S or V, X31 is A or G, X32 is G or A, X33 is S or G, X34 is G or S, X35 is G or Y, X36 is N or S or T or K, X37 is S or G, X38 is L or P, X39 is A or M, X40 is M or V and X41 is P or F.

2. Process according to Claim 1, wherein the mistletoe lectin polypeptide corresponds to the mistletoe lectin A-chain (MLA) or a fragment thereof, and contains the following sequence or a fragment thereof:

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Y E R L R L R V T H Q T T G X1 E Y F R F I T L  
 L R D Y V S S G S F S N E I P L L R Q S T I P  
 V S D A Q R F V L V E L T N Q G X2 D S X3 T A A  
 I D V T N X4 Y V V A Y Q A G D Q S Y F L R D A  
 P R G A E T H L F T G T T R X5 S S L P F X6 G S  
 Y X7 D L E R Y A G H R D Q I P L G I X8 Q L I Q  
 S V X9 A L R X10 P G G S T R X11 Q A R S I L I L  
 I Q M I S E A A R F N P I L W R X12 R Q X13 I N  
 S G X14 S F L P D X15 Y M L E L E T S W G Q Q S  
 T Q V Q H S T D G V F N N P X16 R L A I X17 X18 G  
 N F V T L X19 N V R X20 V I A S L A I M L F V C  
 G E R P S S S

wherein X1 to X20 have the meaning stated above.

3. Process according to Claim 1, wherein the mistletoe lectin polypeptide corresponds to the mistletoe lectin B-chain (MLB) or a fragment thereof, and contains the following sequence or a fragment thereof:

D D V T C S A S E P T V R I V G R X21 G M X22 V D  
 V R D D D F H D G N Q I Q L W P S K S N N D P N  
 Q L W T I K R D X23 T I R S N G S C L T T Y G Y  
 T A G V Y V M I F D C N T A V R E A T I W Q I W  
 X24 N G T I I N P R S N L V L A A S S G I K G T T  
 L T V Q T L D Y T L G Q G W L A G N D T A P R E  
 V T I Y G F R D L C M E S N X25 G S V W V E T C  
 X26 S S Q X27 N Q X28 X29 W A L Y G D G S I R P K Q N  
 Q D Q C L T X30 G R D S V S T V I N I V S C S X31  
 X32 S X33 X34 O R W V F T N E X35 A I L N L K X36 X37  
 X38 X39 X40 D V A Q A N F K L R R I I I Y P A T G  
 K P N Q M W L P V X41

wherein X21 to X41 have the meaning stated above.

4. Mistletoe lectin polypeptide having the following sequence:

Y E R L R L R V T H Q T T G X1 E Y F R F I T L  
 L R D Y V S S G S F S N E I P L L R Q S T I P  
 V S D A Q R F V L V E L T N Q G X2 D S X3 T A A  
 I D V T N X4 Y V V A Y Q A G D Q S Y F L R D A  
 P R G A E T H L F T G T T R X5 S S L P F X6 G S

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Y X7 D L E R Y A G H R D Q I P L G I X8 Q L I Q  
 S V X9 A L R X10 P G G S T R X11 Q A R S I L I L  
 I Q M I S E A A R F N P I L W R X12 R Q X13 I N  
 S G X14 S F L P D X15 Y M L E L E T S W G Q Q S  
 T Q V Q H S T D G V F N N P X16 R L A I X17 X18 G  
 N F V T L X19 N V R X20 V I A S L A I M L F V C  
 G E R P S S S D V R Y W P L V I R P V I A D D  
 V T C S A S E P T V R I V G R X21 G M X22 V D V  
 R D D D F H D G N Q I Q L W P S K S N N D P N  
 Q L W T I K R D X23 T I R S N G S C L T T Y G Y  
 T A G V Y V M I F D C N T A V R E A T I W Q I  
 W X24 N G T I I N P R S N L V L A A S S G I K G  
 T T L T V Q T L D Y T L G Q G W L A G N D T A  
 P R E V T I Y G F R D L C M E S N X25 G S V W V  
 E T C X26 S S Q X27 N Q X28 X29 W A L Y G D G S I R  
 P K Q N Q D Q C L T X30 G R D S V S T V I N I V  
 S C S X31 X32 S X33 X34 Q R W V F T N E X35 A I L N  
 L K X36 X37 X38 X39 X40 D V A Q A N P K L R R I I I  
 Y P A T G K P N Q M W L P V X41

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or a fragment thereof,

wherein X1 is D or E, X2 is G or Q, X3 is I or V, X4 is L or A, X5 is DR or missing, X6 is N or T, X7 is P or T, X8 is D or E, X9 is S or T, X10 is F or Y, X11 is T or A, X12 is A or Y, X13 is Y or D, X14 is A or E, X15 is V or M, X16 is I or F, X17 is P or S, X18 is P or T, X19 is T or S, X20 is D or S, X21 is N or S, X22 is C or R, X23 is G or N, X24 is G or D, X25 is G or Q, X26 is V or D, X27 is Q or K, X28 is G or missing, X29 is R or K, X30 is C or S or V, X31 is A or G, X32 is G or A, X33 is S or G, X34 is G or S, X35 is G or Y, X36 is N or S or T or K, X37 is S or G, X38 is L or P, X39 is A or M, X40 is M or V and X41 is P or F.

5. Mistletoe lectin polypeptide according to Claim 4, comprising the sequence:

Y E R L R L R V T H Q T T G X1 E Y F R F I T L  
 L R D Y V S S G S F S N E I P L L R Q S T I P  
 V S D A Q R F V L V E L T N Q G X2 D S X3 T A A  
 I D V T N X4 Y V V A Y Q A G D Q S Y F L R D A  
 P R G A E T H L F T S T T R X5 S S L P F X6 G S  
 Y X7 D L E R Y A G H R D Q I P L G I X8 Q L I Q  
 S V X9 A L R X10 P G G S T R X11 Q A R S I L I L  
 I Q M I S E A A R F N P I L W R X12 R Q X13 I N  
 S G X14 S F L P D X15 Y M L E L E T S W G Q Q S  
 T Q V Q H S T D G V F N N P X16 R L A I X17 X18 G  
 N F V T L X19 N V R X20 V I A S L A I M L F V C

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G E R P S S S

or a fragment of this sequence, wherein the mistletoe lectin polypeptide corresponds to the MLA chain or a fragment thereof and X1 to X20 have the meaning stated above.

6. Mistletoe lectin polypeptide according to Claim 4, comprising the sequence:

D D V T C S A S E P T V R I V G R X21 G M X22 V D  
 V R D D D F H D G N Q I Q L W P S K S N N D P N  
 Q L W T I K R D X23 T I R S N G S C L T T Y G Y  
 T A G V Y V M I F D C N T A V R E A T I W Q I W  
 X24 N G T I I N P R S N L V L A A S S G I K G T T  
 L T V Q T L D Y T L G Q G W L A G N D T A P R E  
 V T I Y G F R D L C M E S N X25 G S V W V E T C  
 X26 S S Q X27 N Q X28 X29 W A L Y G D G S I R P K Q N  
 Q D Q C L T X30 G R D S V S T V I N I V S C S X31  
 X32 S X33 X34 Q R W V F T N E X35 A I L N L K X36 X37  
 X38 X39 X40 D V A Q A N P K L R R I I I Y P A T G  
 K P N Q M W L P V X41

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or a fragment of this sequence, wherein the mistletoe lectin polypeptide corresponds to the MLB chain or a fragment thereof and X21 to X41 have the meaning stated above.

7. Mistletoe lectin polypeptide according Claim 4, having the sequence shown in Fig.1b.

8. Mistletoe lectin polypeptide according Claim 5, having the sequence shown in Fig.3b.

9. Mistletoe lectin polypeptide according to Claim 6, selected from the following group:

- I) Polypeptide having the sequence shown in Fig.7b.
- II) Polypeptide having the sequence shown in Fig.8b.
- III) Polypeptide having the sequence shown in Fig.9b.
- IV) Polypeptide having the sequence shown in Fig.10b.
- V) Polypeptide having the sequence shown in Fig.11b.
- VI) Polypeptide having the sequence shown in Fig.12b.

10. Process for the preparation of a nucleic acid molecule which codes for a mistletoe lectin polypeptide according to Claim 4 in a heterologous host, comprising the steps:

- a) preparing of mistletoe cell RNA or chromosomal mistletoe cell DNA and
- b) amplifying mistletoe cell RNA or chromosomal mistletoe lectin DNA by PCR using oligonucleotides which are derived from the mistletoe lectin polypeptide shown in Fig.1b, and
- c) if necessary, identifying of sequences which lie 5' and 3' from the amplified nucleic acid and amplification thereof, and
- d) isolating of the nucleic acid molecules amplified in step b) and/or c), and

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- e) if necessary, ligating several of the nucleic acid molecules amplified in step b) and/or c), such that a nucleic acid molecule with a complete open reading frame is obtained and
- f) targeted mutation of the nucleic acid molecule obtained in order to match the nucleic acid molecule to the usual genetic code of the heterologous host for one of the mistletoe lectin polypeptide isoforms identified in mistletoe cells.

11. Nucleic acid molecule, coding for a polypeptide according to Claim 4 and comprising the sequence:

TACGAGAGGCTAAGACTCAGAGTTACGCATCAAACCACGGGCGAKGAATACTTCCGGTTCATCACG  
 CTTCTCCGAGATTATGTCTCAAGCGGAAGCTTTTCCAATGAGATAACCACTCTTGCGTCAGTCTACG  
 ATCCCCGTCTCCGATGCGCAAAGATTGTCTTGGTGGAGCTCACCAACCAGGGGSRRGACTCGRTY  
 ACGGCCGCCATCGACGTTACCAATSYKTACGTCGTGGCTTACCAAGCAGGCGACCAATCCTACTTT  
 TTGCGCGACGCACCACGCGGCGCGGAAACGCACCTETTCACCGGACGACGGGAZ1TCCTCTCTCC  
 CATTCA MYGGAAGCTACMCY GATCTGGAGCGATACGCCGACATAGGGACCAGATCCCTCTCGGTA  
 TAGASCAACTCATTCAATCCGTCWCKGCGCTTCGTTWYCGGGCGGCAGCAGCGTRCYCAAGCTC  
 GTTCGATTTTAATCCTCATT CAGATGATCTCCGAGGCGGCCAGATTCAATCCCATCTTATGGAGGK  
 MYCGCCAAKAYATTAACAGTGGGGMRTCATTTCTGCCAGACRTGTACATGCTGGAGCTGGAGACGA  
 GTTGGGGCCAACAATCCACGCAAGTCCAGCATTCAACCGATGGCGTTTTTAATAACCCAWTYCGGT  
 TGGCTATAYCYMCYGGTAACCTCGTGACGTTGWCYAATGTTGCKMYGTGATCGCCAGCTTGGCGA  
 TCATGTTGTTTGTATGCGGAGAGCGGCCATCTTCCTCTGACGTGCGCTATTGGCCGCTGGTCATAC

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GACCCGTGATAGCCGATGATGTTACCTGCAGTGCTTCGGAACCTACGGTGCGGATTGTGGGTCGAA  
 RTGGCATGYGCGTGACGTCCGAGATGACGATTTCCACGATGGGAATCAGATACAGTTGTGGCCCT  
 CCAAGTCCAACAATGATCCGAATCAGTTGTGGACGATCAAAAGGGATRRMACCATTCGATCCAATG  
 GCAGCTGCTTGACCACGTATGGCTATACTGCTGGCGTCTATGTGATGATCTTCGACTGTAATACTG  
 CTGTGCGGGAGGCCACTATTTGGCAGATATGGGRCAATGGGACCATCATCAATCCAAGATCCAATC  
 TGGTTTTGGCAGCATCATCTGGAATCAAAGGCACTACGCTTACGGTGCAAACACTGGATTACACGT  
 TGGGACAGGGCTGGCTTGCCGGTAATGATACCGCCCCACGCGAGGTGACCATATATGGTTTCAGGG  
 ACCTTTGCATGGAATCAAATSRAGGGAGTGTGTGGGTGGAGACGTGCGWSAGTAGCCAAMAGAACC  
 AAZ2ARATGGGCTTTGTACGGGGATGGTTCTATACGCCCCAAACAAAACCAAGACCAATGCCTCAC  
 CKBTGGGAGAGACTCCGTTTCAACAGTAATCAATATAGTTAGCTGCAGCGSWGSWTCGKSKKSKCA  
 GCGATGGGTGTTTACCAATGAAKRSGCCATTTTGAATTTAAAGAVWRGSYYGRYSRTGGATGTGGC  
 GCAAGCAAATCCAAAGCTCCGCCGAATAATTATCTATCCTGCCACAGGAAAACCAAATCAAATGTG  
 GCTTCCCGTGYYMTGA

or a fragment thereof, wherein the nucleotides are defined in accordance with the IUPAC-IUB code, and  $Z_1$  designates the nucleotide sequence GAT AGA or is missing and  $Z_2$  designates the nucleotide sequence GGC or is missing.

12. Nucleic acid molecule which codes for a polypeptide according to Claim 5 in a heterologous host, comprising the sequence:

TACGAGAGGCTAAGACTCAGAGTTACGCATCAAACCACGGGCGAKGAATACTTCCGGTTCATCACG

CTTCTCCGAGATTATGTCTCAAGCGGAAGCTTTTCCAATGAGATACCACTCTTGCGTCAGTCTACG  
 ATCCCCGTCTCCGATGCGCAAAGATTTGTCTTGGTGGAGCTACCAACCAGGGGSRRGACTCGRTY  
 ACGGCCGCCATCGACGTTACCAATSYKTACGTCGTGGCTTACCAAGCAGGCGACCAATCCTACTTT  
 TTGCGCGACGCACCACGCGGCGCGGAAACGCACCTCTTCACCGGCACCACCCGAZ<sub>1</sub>TCCTCTCTCC  
 CATTCAMYGGAAGCTACMCYGATCTGGAGCGATACGCCGGACATAGGGACCAGATCCCTCTCGGTA  
 TAGASCAACTCATTCAATCCGTCWCKGCGCTTCGTTWYCCGGCGGCAGCACGCGTRCYCAAGCTC  
 GTTCGATTTTAATCCTCATTGATGATCTCCGAGGCCGCCAGATTCAATCCCATCTTATGGAGGK  
 MYCGCCAAKAYATTAACAGTGGGGMRTCATTTCTGCCAGACRTGTACATGCTGGAGCTGGAGACGA  
 GTTGGGGCCAACAATCCACGCAAGTCCAGCATTCAACCGATGGCGTTTTTAATAACCCAWTYCGGT  
 TGGCTATAYCYMCYGGTAACTTCGTGACGTTGWCYATGTTGGCCTMYGTGATCGCCAGCTTGGCGA  
 TCATGTTGTTTGTATGCCGAGAGCGGCCATCTTCCTCT

or a fragment thereof, wherein the nucleotides are defined in accordance with the IUPAC-IUB code, and Z<sub>1</sub> designates the nucleotide sequence GAT AGA or is missing.

13. Nucleic acid which codes for a polypeptide according to Claim 6 in a heterologous host, comprising the sequence:

GATGATGTTACCTGCAGTGCTTCGGAACCTACGGTGCGGATTGTGGGTGCAARTGGCATGYGCGTG  
 GACGTCCGAGATGACGATTTCCACGATGGGAATCAGATACAGTTGTGGCCCTCCAAGTCCAACAAT  
 GATCCGAATCAGTTGTGGACGATCAAAAGGGATRRMACCATTCGATCCAATGGCAGCTGCTTGACC  
 ACGTATGGCTATACTGCTGGCGTCTATGTGATGATCTTCGACTGTAATACTGCTGTGCGGGAGGCC

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ACTATTTGGCAGATATGGGRCAATGGGACCATCATCAATCCAAGATCCAATCTGGTTTTGGCAGCA  
 TCATCTGGAATCAAAGGCACTACGCTTACGGTGCAAACACTGGATTACACGTTGGGACAGGGCTGG  
 CTTGCCGGTAATGATACCGCCCCACGCGAGGTGACCATATATGGTTTCAGGGACCTTTGCATGGAA  
 TCAAATSRAGGGAGTGTGTGGGTGGAGACGTGCGWSAGTAGCCAAMAGAACCAAZ2ARATGGGCTT  
 TGTACGGGGATGGTTCTATACGCCCCAAACAAAACCAAGACCAATGCCTCACCCKBTGGGAGAGACT  
 CCGTTTCAACAGTAATCAATATAGTTAGCTGCAGCGSWGSWTCGKSKKSKCAGCGATGGGTGTTTA  
 CCAATGAAKRSGCCATTTGAATTTAAAGAVWRGSYYGRYSRTGGATGTGGCGCAAGCAAATCCAA  
 AGCTCCGCCGAATAATTATCTATCCTGCCACAGGAAAACCAAATCAAATGTGGCTTCCCGTGYMT  
 GA

or a fragment thereof, wherein the nucleotides are defined in accordance with the IUPAC-IUB code, and Z<sub>2</sub> designates the nucleotide sequence GGC or is missing.

14. Nucleic acid molecule according to Claim 11, having the sequence shown in Fig. 1a.

15. Nucleic acid molecule according to Claim 12, selected from the following group:

- I) Nucleic acid having the sequence shown in Fig. 2a.
- II) Nucleic acid having the sequence shown in Fig. 3a.

or a fragment thereof.

16. Nucleic acid molecule according to Claim 13, selected from the following group:

- I) Nucleic acid with the sequence shown in Fig. 7a.

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- II) Nucleic acid with the sequence shown in Fig. 8a.
- III) Nucleic acid with the sequence shown in Fig. 9a.
- IV) Nucleic acid with the sequence shown in Fig. 10a.
- V) Nucleic acid with the sequence shown in Fig. 11a.
- VI) Nucleic acid with the sequence shown in Fig. 12a.

or a fragment thereof.

17. Nucleic acid molecule coding for a mistletoe lectin polypeptide according to at least one of Claims 4 ~~to 9~~ or for a fragment thereof, wherein the codon usage is adapted to the requirements of a heterologous host.

18. Nucleic acid molecule according to Claim 17 having the sequence shown in Fig. 4a, wherein the codon usage is adapted to the preferred codon usage of the genus Brassica.

19. Nucleic acid molecule according to Claim 17, selected from the following group:

- I) Nucleic acid with the sequence shown in Fig. 5a,
- II) Nucleic acid with the sequence shown in Fig. 6a.

20. Nucleic acid molecule according to Claim 17, selected from the following group:

- I) Nucleic acid with the sequence shown in Fig. 13a,
- II) Nucleic acid with the sequence shown in Fig. 14a,
- III) Nucleic acid with the sequence shown in Fig. 15a,
- IV) Nucleic acid with the sequence shown in Fig. 16a,
- V) Nucleic acid with the sequence shown in Fig. 17a,

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VI) Nucleic acid with the sequence shown in Fig. 18a.

21. Vector which comprises a nucleic acid molecule according to one of Claims 11 to 20 or a fragment thereof and a promoter functionally linked thereto.

22. Vector according to Claim 21, wherein the promoter is a specific promoter for an intended host cell.

23. Vector according to Claim 21 and/or 22, wherein the vector is an RNA vector.

24. Host cell for carrying out the process according to one of Claims 1 to 3, which can be a bacterial cell, a plant cell with the exception of a mistletoe cell, an insect larva, an insect cell, a vertebrate cell, preferably a mammalian cell, a yeast cell, a fungal cell, a transgenic vertebrate and/or a transgenic plant with the exception of a mistletoe plant and contains a nucleic acid molecule according to one of Claims 11 to 20 or a vector according to one of Claims 21 to 23.

25. Host cell according to Claim 24, wherein the bacterial cell is *Escherichia coli* and/or the plant cell is a rape cell and/or the insect larva cell is *Trichoplusia ni* and/or the insect cell is a *Spodoptera frugiperda* cell and/or the vertebrate is a zebra fish.

26. Pharmaceutical composition, containing at least one nucleic acid molecule according to one of Claims 11 to 20 or at least one vector according to one of Claims 21 to 23.

27. Pharmaceutical composition according to Claim 26, further containing liposomes.

28. Pharmaceutical composition according to Claim 27, wherein the liposomes bear cell recognition molecules on their surface, wherein the cell recognition molecule selectively binds to target cells.

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a 29. Pharmaceutical composition according to Claim 26, further containing MLB polypeptide according to one of Claims 6 ~~or 9~~.

30. Pharmaceutical composition according to Claim 29, wherein the MLB polypeptide or the nucleic acid molecule or the vector is coupled to a cell recognition molecule, wherein the cell recognition molecule selectively binds to target cells.

31. Pharmaceutical composition according to Claim 26, wherein the nucleic acid or the vector are associated with a virus particle.

32. Pharmaceutical composition according to Claim 31, wherein the virus particle bears a cell recognition molecule on its surface, wherein the cell recognition molecule selectively binds to target cells.

a 33. Pharmaceutical composition which contains at least one polypeptide according to Claim 4 ~~to 9~~ and/or a fragment thereof.

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34. Pharmaceutical composition according to Claim 33, further containing a suitable cell recognition molecule, wherein the cell recognition molecule selectively binds to target cells.

35. Pharmaceutical composition according to Claim 34, wherein the cell recognition molecule is selected from the group comprising antibody molecules or antibody fragments, cell receptor ligands, peptide hormones or fragments thereof.

a 36. Use of a mistletoe lectin polypeptide according to at least one of Claims 4 ~~to 9~~ and/or a fragment thereof for the production of a medicament for the treatment of uncontrolled cell growth.

a 37. Use of a mistletoe lectin polypeptide according to at least one of Claims 4 ~~to 9~~ and/or a fragment thereof without cytotoxic activity for the production of a medicament which intensifies the immune reaction.

38. Use according to Claim 37, wherein the medicament includes a further antigen.
39. Use according to Claim 38, wherein the further antigen is a tumour-induced antigen, a bacterial or viral antigen.
40. Process for the production of a mistletoe lectin polypeptide in mistletoe cells and/or a transgenic mistletoe plant having the sequence:

Y E R L R L R V T H Q T T G X1 E Y F R F I T L  
 L R D Y V S S G S F S N E I P L L R Q S T I P  
 V S D A Q R F V L V E L T N Q G X2 D S X3 T A A  
 I D V T N X4 Y V V A Y Q A G D Q S Y F L R D A  
 P R G A E T H L F T G T T R X5 S S L P F X6 G S  
 Y X7 D L E R Y A G H R D Q I P L G I X8 Q L I Q  
 S V X9 A L R X10 P G G S T R X11 Q A R S I L I L  
 I Q M I S E A A R F N P I L W R X12 R Q X13 I N  
 S G X14 S F L P D X15 Y M L E L E T S W G Q Q S  
 T Q V Q H S T D G V F N N P X16 R L A I X17 X18 G  
 N F V T L X19 N V R X20 V I A S L A I M L F V C  
 G E R P S S S D V R Y W P L V I R P V I A D D  
 V T C S A S E P T V R I V G R X21 G M X22 V D V

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R D D D F H D G N Q I Q L W P S K S N N D P N  
 Q L W T I K R D X23 T I R S N G S C L T T Y G Y  
 T A G V Y V M I F D C N T A V R E A T I W Q I  
 W X24 N G T I I N P R S N L V L A A S S G I K G  
 T T L T V Q T L D Y T L G Q G W L A G N D T A  
 P R E V T I Y G F R D L C M E S N X25 G S V W V  
 E T C X26 S S Q X27 N Q X28 X29 W A L Y G D G S I R  
 P K Q N Q D Q C L T X30 G R D S V S T V I N I V  
 S C S X31 X32 S X33 X34 Q R W V F T N E X35 A I L N  
 L K X36 X37 X38 X39 X40 D V A Q A N P K L R R I I I  
 Y P A T G K P N Q M W L P V X41

or a fragment thereof, comprising the step of expressing by means of a eukaryotic vector,  
 which contains a nucleic acid coding for the mistletoe lectin polypeptide or a fragment thereof  
 having the nucleic acid sequence originally found in mistletoe cell DNA, in a mistletoe cell  
 and/or a transgenic mistletoe plant, wherein the transcription product of this nucleic acid  
 molecule is modified in mistletoe cells and/or transgenic mistletoe plants by postranscriptional  
 and/or posttranslational mechanisms, wherein X1 is D or E, X2 is G or Q, X3 is I or V, X4 is  
 L or A, X5 is DR or missing, X6 is N or T, X7 is P or T, X8 is D or E, X9 is S or T, X10 is F  
 or Y, X11 is T or A, X12 is A or Y, X13 is Y or D, X14 is A or E, X15 is V or M, X16 is I or  
 F, X17 is P or S, X18 is P or T, X19 is T or S, X20 is D or S, X21 is N or S, X22 is C or R,  
 X23 is G or N, X24 is G or D, X25 is G or Q, X26 is V or D, X27 is Q or K, X28 is G or

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missing, X29 is R or K, X30 is C or S or V, X31 is A or G, X32 is G or A, X33 is S or G, X34 is G or S, X35 is G or Y, X36 is N or S or T or K, X37 is S or G, X38 is L or P, X39 is A or M, X40 is M or V and X41 is P or F.

41. Process according to Claim 40, wherein the mistletoe lectin polypeptide corresponds to the mistletoe lectin A-chain or a fragment thereof and includes the following sequence or a fragment thereof:

Y E R L R L R V T H Q T T G X1 E Y F R F I T L  
 L R D Y V S S G S F S N E I P L L R Q S T I P  
 V S D A Q R F V L V E L T N Q G X2 D S X3 T A A  
 I D V T N X4 Y V V A Y Q A G D Q S Y F L R D A  
 P R G A E T H L F T G T T R X5 S S L P F X6 G S  
 Y X7 D L E R Y A G H R D Q I F L G I X8 Q L I Q  
 S V X9 A L R X10 P G G S T R X11 Q A R S I L I L  
 I Q M I S E A A R F N P I L W R X12 R Q X13 I N  
 S G X14 S F L P D X15 I M L E L E T S W G Q Q S  
 T Q V Q H S T D G V F N N P X16 R L A I X17 X18 G  
 N F V T L X19 N V R X20 V I A S L A I M L F V C  
 G E R P S S S

wherein X1 to X20 have the meaning stated above.

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42. Process according to Claim 40, wherein the mistletoe lectin polypeptide corresponds to the mistletoe lectin B-chain or a fragment thereof and includes the following sequence or a fragment thereof:

D D V T C S A S E P T V R I V G R X21 G M X22 V D  
 V R D D D F H D G N Q I Q L W P S K S N N D P N  
 Q L W T I K R D X23 T I R S N G S C L T T Y G Y  
 T A G V Y V M I F D C N T A V R E A T I W Q I W  
 X24 N G T I I N P R S N L V L A A S S G I K G T T  
 L T V Q T L D Y T L G Q G W L A G N D T A P R E  
 V T I Y G F R D L C M E S N X25 G S V W V E T C  
 X26 S S Q X27 N Q X28 X29 W A L Y G D G S I R P K Q N  
 Q D Q C L T X30 G R D S V S T V I N I V S C S X31  
 X32 S X33 X34 Q R W V F T N E X35 A I L N L K X36 X37  
 X38 X39 X40 D V A Q A N P K L R R I I I Y P A T G  
 K P N Q M W L P V X41

wherein X21 to X41 have the meaning stated above.

43. Process for the preparation of a nucleic acid molecule, which codes for a mistletoe lectin polypeptide according to Claim 4 in a mistletoe cell and/or a transgenic mistletoe plant, comprising the steps:

a) preparing of mistletoe cell RNA or chromosomal mistletoe cell DNA and

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- b) amplifying mistletoe cell RNA or chromosomal mistletoe lectin DNA by PCR using oligonucleotides which are derived from the mistletoe lectin polypeptide shown in Fig. 1b, and
- c) if necessary, identifying of sequences which lie 5' and 3' from the amplified nucleic acid and amplification thereof, and
- d) isolating of the nucleic acid molecules amplified in step b) and/or c), and
- e) if necessary, ligating several of the nucleic acid molecules isolated in step b) and/or c), such that a nucleic acid molecule with a complete open reading frame is obtained and
- f) if necessary, targeted mutation of the nucleic acid molecule obtained in order to match the nucleic acid molecule to the usual genetic code for one of the mistletoe lectin polypeptide isoforms identified in mistletoe cells and/or to optimise expression.

44. Process for production of a polypeptide according to one of Claims 1 to 3 or 40 to 42, including as a further step the modification of sugar side-chains by enzymatic and/or chemical addition, removal and/or modification of one or several side-chains.

45. Process according to Claim 44, wherein the addition, removal and/or modification of the sugar side-chains leads to matching to the natural proteins.

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